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AN APPRAISAL SURVEY OF THE IPS ENGRAVER BEETLES IN SNOW-DAMAGED PINES ARROWHEAD INFESTATION AREA SAN BERNARDINO N. F., CALIFORNIA

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INTRODUCTION

During March, 1952, heavy snow and ice storms broke the tops from a large number of trees along the crest of the San Bernardino Mountain Range on the San Bernardino National Forest in Southern California. While some top breakage occurred all along the crest of this range, the heaviest damage occurred in young, dense Coulter and ponderosa pine stands in the Arrowhead Zone of Infestation. As a result of this damage, ideal conditions were created for a buildup of Ips confusus and Ips oregoni, which are a potential threat to the intensive maintenance control program being conducted in the Arrowhead-Crestline area through the cooperative efforts of the federal government, the California State Division of Forestry, and the private land owners. The land-managing agencies concerned indicated that they were very anxious to eliminate this threat and requested an appraisal of the situation and appropriate action to prevent an Ips outbreak from starting in this material.

During the last week in April an appraisal survey was made by representatives at the Bureau of Entomology and Plant Quarantine and the U. S. Forest Service to determine the extent and distribution of this damage. The survey showed that while there had been scattered top breakage throughout most of the area, the heaviest concentrations occurred in the Running Springs, Lake Arrowhead, Alpine, and Crestline areas. These areas, where the damage was severe enough to create an accumulation of material, and where a potential threat of an Ips epidemic exists, are outlined on the attached infestation map. Approximately 4600 acres, 2900 private and 1900 federal, are involved.

SURVEY RESULTS

During the course of the survey it was found that there was a great deal of variation in the size and distribution of the broken tops within each area (See Figs. 1, 2, and 3). Three plots, totaling six acres, were cruised to determine the average number of stems, four inches and over in diameter, per acre. One plot was selected where the damage had been relatively light, a second where it was quite heavy, and the third where it had been moderate. It was found that there were 1.2 stems per acre on the first plot, 15 stems per acre on the second, and 6 stems per acre on the third. From the data obtained it was estimated that tree damage averaged 7 stems per acre over the 4800 acres involved, or a total of 33,600 trees. The broken tree tops were readily attacked by both species of Ips beetles beginning early in May, and by mid-month all top material had become heavily infested and aggressive broods ranging in size from small to half-grown larvae were abundant.

Information from which to prepare a reliable estimate on the cost of treating this material to kill broods present was not immediately available therefore the U. S. Forest Service treated a sample plot to determine the number of acres that could be covered per man day and the average quantity of spray solution needed per stem. Three men worked for a four-hour period in an area where the damage was representative of the entire area. During the 1.5 man days expended, 433 stems were treated on 62 acres. Thirty-seven gallons of spray mix was used to treat these 433 tops. The data obtained indicated that 40 acres could be treated per man day and that 12 tops could be treated per gallon of spray mix. The original estimate of seven stems per acre was substantiated in the plot area selected for spray treatment.

CONTROL RECOMMENDATIONS

Subsequent to the survey the following recommendations were made to the land-managing agencies for preventing a buildup of Ips beetles in this top-damaged material:

(1) All broken tops four inches and over in diameter within the areas outlined on the attached infestation map should be treated with a 5% solution of the gamma isomer of benzene hexachloride in diesel oil before any broods emerged.

(2) The work should be started by May 19, 1952, and every effort made to complete the treating by June 13, 1952.

(3) Hand operated, pressurized knapsack type back pumps, of four-gallon capacity, would be the most efficient type of sprayer for treating this material.

Cost of treatment was estimated as follows:

Labor (120 man days at $12)	$1440.00
Spray (2800 gals. at .30)	840.00
Miscellaneous (equipment, rental, etc.)	120.00
TOTAL	$2400.00
Cost per acre	0.50
Total cost on private land	$1450.00
Total cost on federal land	$ 950.00

TOP DAMAGE RESULTING FROM SEVERE SNOW AND ICE STORMS
IN THE
LAKE ARROWHEAD AREA

FIG. I

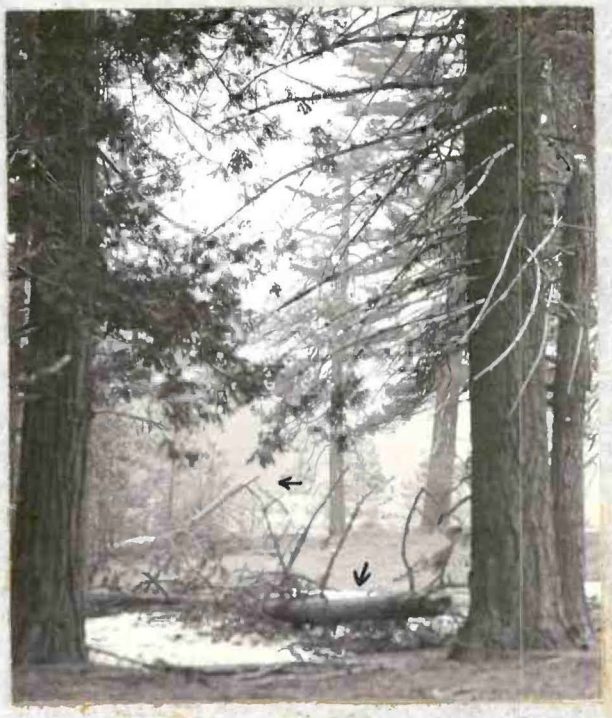
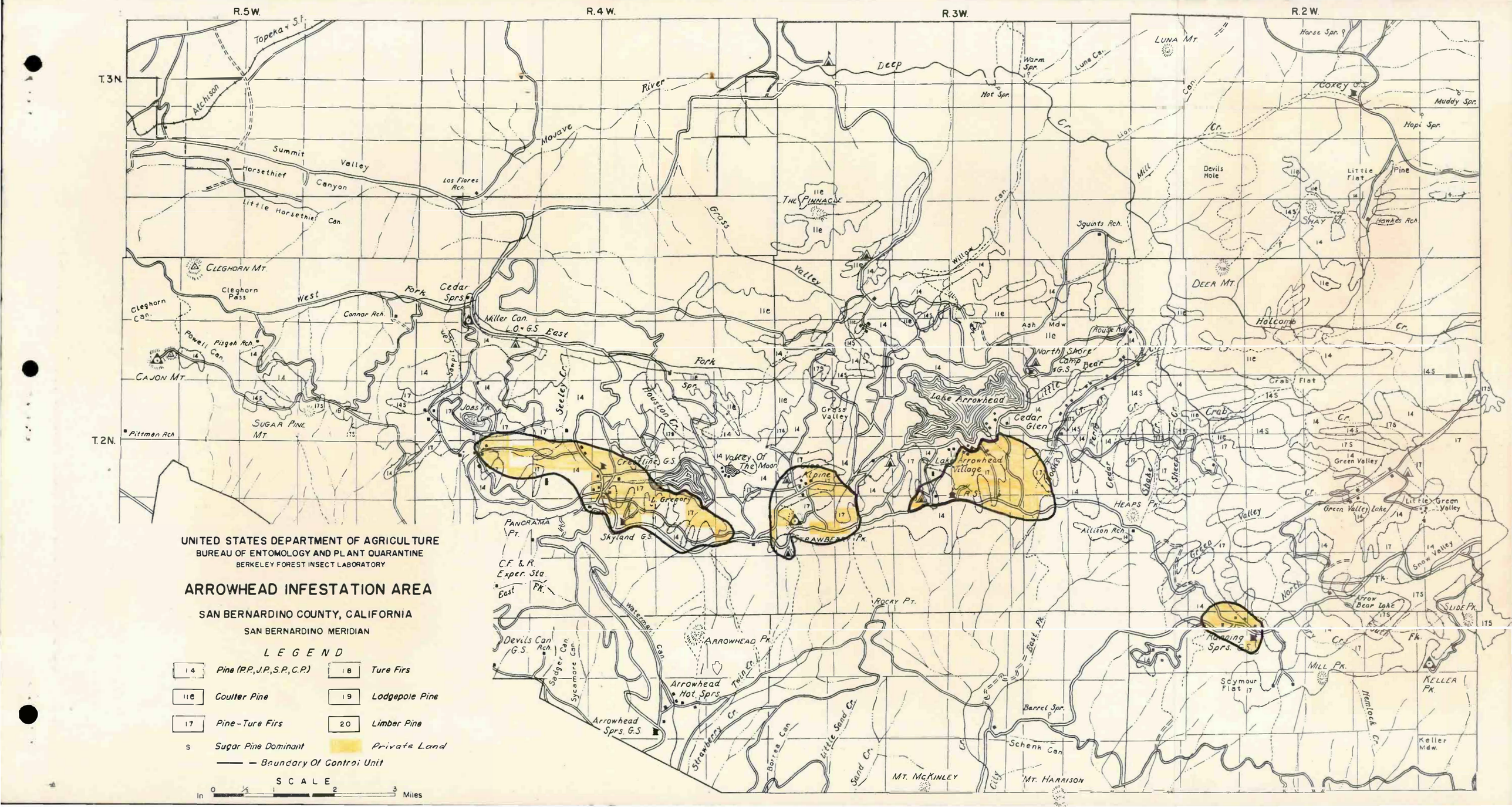


FIG. II

FIG. III


R.5W.
R.4W.
R.3W.
R.2W.
T.3N.
T.2N.
Topeka & S.F.
Atchison
Summit Valley
Horsethief Canyon
Little Horsethief Can.
Los Flores Rch.
Mojave River
Grass Valley
THE PINNACLE
Deep
Warm Spr.
Hot Spr.
Luna Can.
Lion Can.
Mill Can.
LUNA MT.
Coxey Cr.
Horse Spr.
Muddy Spr.
Hopi Spr.
Devils Hole
Little Pine Flat
Pine
SHAY MT.
Hankes Rch.
Squints Rch.
Willow Can.
DEER MT.
Holcomb Cr.
CLEGHORN MT.
Cleghorn Pass
Cleghorn Can.
West Fork
Cedar Spr.
Miller Can.
O.G.S. East Fork
Connor Rch.
Powell Can.
Pisgah Rch.
CAJON MT.
Pittman Rch.
SUGAR PINE MT.
Seeley Cr.
Houston Cr.
Jobs Pk.
Jobs Pk. Spr.
Grass Valley
Lake Arrowhead
Cedar Glen
North Shore Camp
Bear G.S.
House Rch.
Ash Mdw.
Little Bear Cr.
Crab Flat
Crab Cr.
Cedar Cr.
Shade Cr.
Sheep Cr.
Green Valley
Green Valley Lake
Little Green Valley
Snow Valley
Creepline G.S.
Valley Of The Moon
Alpine
Lake Arrowhead Village
R.S.
L. Gregory
Skyland G.S.
STRAWBERRY PK.
HEAPS PK.
Allison Rch.
PANORAMA PT.
C.F. & R. Exper. Sta.
EAST PK.
Waterman Can.
Devils Can G.S.
Rch.
Sycamore Can.
Badger Can.
ARROWHEAD PK.
ROCKY PT.
Arrowhead Hot Spr.
Twin Cr.
Arrowhead Spr. G.S.
Strawberry Cr.
Borrea Can.
Little Sand Cr.
Sand Cr.
Barrel Spr.
Schenk Can.
Running Spr.
Arrow Bear Lake
SLIDE PK.
MILL PK.
KELLER PK.
Seymour Flat
Hemlock Cr.
Keller Mdw.
MT. McKINLEY
MT. HARRISON
UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
BERKELEY FOREST INSECT LABORATORY
ARROWHEAD INFESTATION AREA
SAN BERNARDINO COUNTY, CALIFORNIA
SAN BERNARDINO MERIDIAN
LEGEND
14 Pine (P.P., J.P., S.P., C.P.)
18 Ture Firs
11e Coulter Pine
19 Lodgepole Pine
17 Pine-Ture Firs
20 Limber Pine
S Sugar Pine Dominant
Private Land
Boundary Of Control Unit
SCALE
In 0 ½ 1 2 3 Miles